



2018 Rate Determination Field Survey Methodology

Public Workshop – April 28, 2016



Welcome!



Introductions

CalRecycle, Division of Recycling, Research Staff:

- **Stephanie Cheung**
- **Glen Baldwin**
- **Graham Johnson**
- **Michael Vanderburg**



Agenda

- **Workshop Purpose**
- **2018 Rate Study Methodology**
- **Financial Risk Assessment**
- **Confidence Levels / Error Rates**
- **Survey Sites / Sample Size / Survey Methodology**
- **Bale Study – Initial Findings**
- **Discuss Future Workshops – Related to Bale Rate Study**
- **Questions / Comments / Input / Ideas**



Workshop Purpose

California Beverage Container Recycling & Litter Reduction Act Section: 14549.5

“ . . . the department shall . . . consult with private and public operators of curbside recycling programs, collection programs, and recycling centers concerning . . . ”



Workshop Purpose

Concerning . . .

- The size of the statewide sample
 - # of containers surveyed
- Appropriate sampling methodologies
 - How and where samples are acquired and surveys conducted
- Alternatives to exclusive reliance on a statewide commingled rate
 - Is there a better way to pay out monies from the Fund?



Our Goal

To ensure payment of the most accurate rates feasible in order to properly compensate consumers and industry, and to protect the solvency and integrity of the California Redemption Value (CRV) Fund.



2018 Rate Study Methodology



Number of CRV Containers Sold Annually In California

PET	10,227,000,000
Aluminum	8,267,000,000
Glass	3,148,000,000
HDPE	272,140,000
Other	<u>238,860,000</u> (bi-metal & #3 - #7 plastics)
Total	22,153,000,000



Financial Risk Assessment

- **Determine financial risk for each program and material:**
 - **Determine the monetary value of each material and for each program**
 - **Rank the monetary value from high to low**



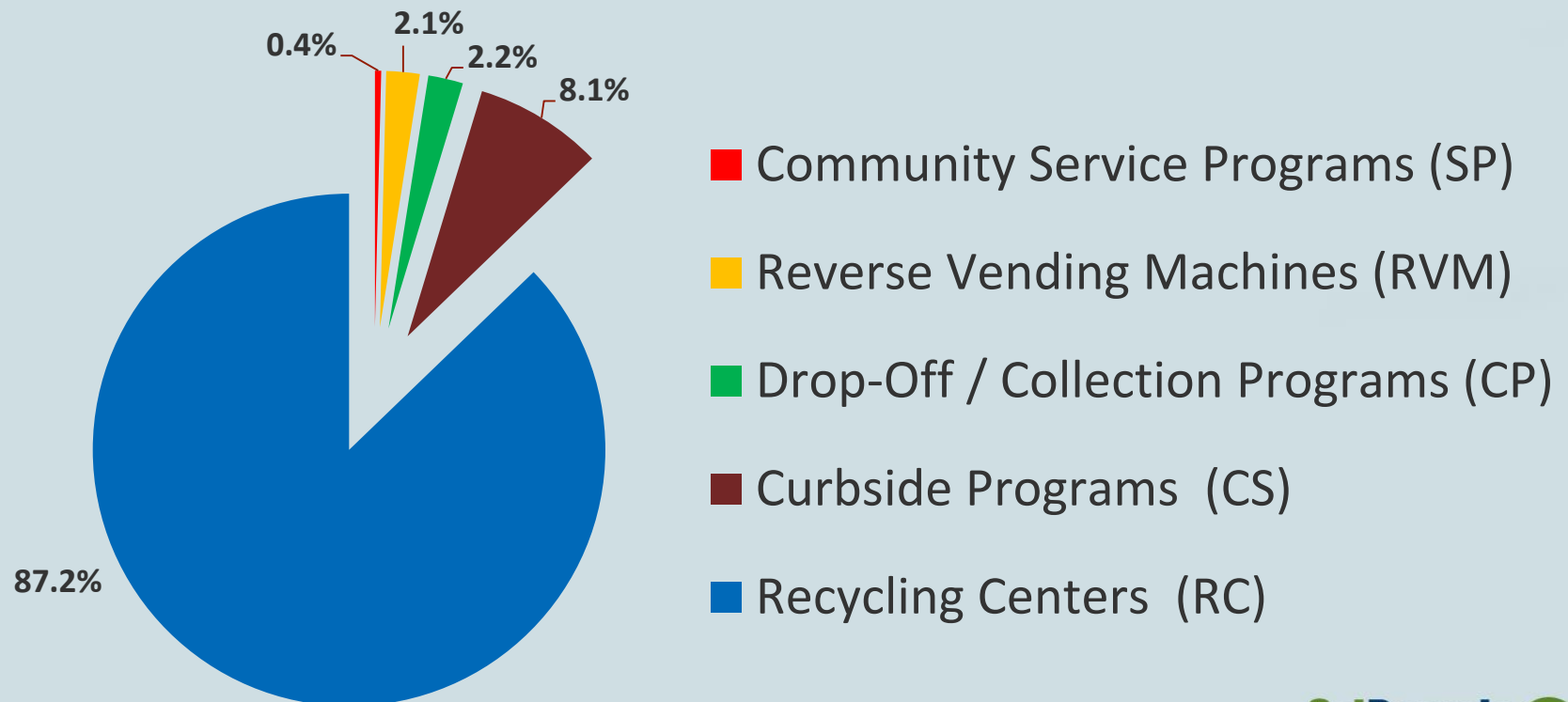
2018 CMRS Risk Assessment – All Programs

- **Estimate Annual Value of Redeemed Materials**

\$1.12 billion



Monetary Value – All Recycling Programs





Financial Risk Assessment

- Based on the financial risk, and other factors:
 - Determine confidence levels and error rates for each program and material type
 - Determine the number of containers to sample for each material for each program type
 - Determine the number of sites to survey for each program type



Definition:

Confidence Level / Confidence Interval

- A percentage which represents the probability that the value of a parameter falls within a specified range of values.
- A confidence of 95%, means a 95% certainty that our survey results will capture the true population parameter.
- A confidence of 99%, means a 99% certainty that our survey results will capture the true population parameter.



Definition: Error Rate

The “margin of error” expresses the maximum expected difference between the true population parameter and a survey sample.

Though it is impossible to sample all containers in a population, results from the sample would be close to, and representative, of the entire population, with a high level of confidence.



Why Do We Care About Confidence Levels & Error Rates?

- **Impacts recycling rates, and the \$1 billion+ CRV Fund**
- **It monetarily impacts every consumer and industry stakeholder who deals with CRV material**
- **We all need confidence and assurance that the rates are reliable and accurate**



Regulatory Rate Calculation Goals

CALIFORNIA CODE OF REGULATIONS

**TITLE 14. NATURAL RESOURCES, DIVISION 2., CHAPTER 5.,
SUBCHAPTER 1., § 2000. - DEFINITIONS.**

**"Statistical Sample" means an estimate with an 85%
confidence level**



Current Rate Calculation Goals

Our Current Minimum Goals:

95% Confidence Level

5% Error Rate

Most materials are currently surveyed at a
95% Confidence Level with a 2% - 5% Error Rate



Rate Calculation Goals

For Highest Value Materials:

99% Confidence Level

Less than 2% Error Rates

(RC – PET, Aluminum, and Glass material)

(85% of all redeemed CRV)



Sample Size Calculation

- Sample size is adjusted based on:
 - Standard Deviation of container weights
 - Standard Deviation of site survey material
- Based on data from previous year studies



2018 Rate Study Survey Sites



Proposed Number of Sites to Survey for 2018 Rate Year

- | | |
|----------------------------------|-----------------|
| • Recycling Centers | 70 sites |
| • Curbside Programs | 39 sites |
| • Drop-Off / Collection Programs | 30 sites |
| • Reverse Vending Machines | 20 sites |
| • Community Service Programs | <u>18 sites</u> |
| • Total | 177 sites |



Survey Site Selection

Population Determination:

- Currently operational programs
- Certified at least eight months during prior Fiscal Year
- Reported volume to DORiiS during prior Fiscal Year
- Not receiving an Individual Commingled Rate (ICR)



Site Selection

Sites are grouped by region:

- **Southern California**
 - Los Angeles, San Diego, Orange, Riverside, San Bernardino, Ventura, Santa Barbara, and Imperial Counties (8 counties)
- **Northern California**
 - All other counties (50 counties)



Survey Site Selection

- Sites are randomly selected by a computer program
- Sites are placed in volume strata for each region
- Proportional number of sites are selected from each volume strata



What is Volume Strata?

Sites are stratified based on received PET volumes

- **Strata #1** **Top 50% of volume** **(high volume)**
- **Strata #2** **Next 25% of volume** **(medium volume)**
- **Strata #3** **Lowest 25% of volume** **(low volume)**



2018 Rate Study Periods

- 12 month study / Two six-month survey rounds
 - Round #1 - October 1, 2016 to March 31, 2017
 - Round #2 - April 1, 2017 to September 30, 2017
- Same sites surveyed in each six-month round (354 sites)
- The same number of containers are surveyed for each material type at each type of recycling program



Rate Study Periods

- Surveys are scheduled every month of the year
- Surveys are scheduled during 35-40 weeks of the year
- Surveys are conducted every day of the week for RCs
- Surveys are distributed evenly over all seasons
 - To reflect “seasonality” (all seasons of the year)



Materials Sampled

- Recycling Centers (RCs)
 - Aluminum
 - Glass
 - HDPE plastic
 - PET plastic
 - Bi-Metal
 - #3 - #7 plastic resins



Materials Sampled

- Curbside (CS), Drop-Off / Collection (CP), Community Service Programs (SP), RVMs
 - Aluminum
 - Glass
 - HDPE plastic
 - PET plastic



Projected 2018 Annual Sample Recycling Centers

- Aluminum = 9,000 containers
- Glass = 9,000 containers
- HDPE = 9,000 containers
- PET = 35,000 containers
- Bi-Metal = 3,000 containers
- #3 - #7 plastics = 3,000 containers

68,000+



Projected 2018 Annual Sample Curbside Programs

• Aluminum	=	2,500	containers
• Glass	=	4,000	containers
• HDPE	=	9,000	containers
• PET	=	<u>6,000</u>	containers
21,000+			



Projected 2018 Annual Sample Collection Programs

• Aluminum	=	1,500	containers
• Glass	=	2,500	containers
• HDPE	=	2,500	containers
• PET	=	<u>3,500</u>	containers
10,000+			



Projected 2018 Annual Sample Reverse Vending Machines

• Aluminum	=	3,000	containers
• Glass	=	1,500	containers
• HDPE	=	400	containers
• PET	=	<u>15,000</u>	containers
		19,000+	



Projected 2018 Annual Sample Community Service Programs

• Aluminum	=	800	containers
• Glass	=	1,500	containers
• HDPE	=	3,000	containers
• PET	=	<u>2,500</u>	containers
		8,000+	



Projected Total 2018 Annual Sample

125,000+

(Aluminum, Glass, HDPE, PET, Bi-Metal, and #3 - #7 plastics)



Survey Sample Selection

- **Recycling Centers / RVMs**
 - After customer transaction completed
 - Confirm “basis” of purchase from customer
 - Random / unbiased selection
 - Survey whole containers only



Survey Sample Analysis

- Containers purchased as a single material type are counted and weighed into batches
 - RC / RVM – as purchased
 - Includes non-CRV and “contaminants”
 - CS / CP / SP – in “market ready” condition
 - To best represent bales reported to CalRecycle



Survey Sample Analysis

- Container batches are further sorted, counted, weighed, and analyzed
 - CRV less than 24 oz. (5 cents)
 - CRV \geq 24 oz. (10 cents)
 - Non-CRV material
 - Product Codes
 - Contaminants



Calculations / Data

- Data from all surveys are combined by program type:
 - Containers Per Pound (CPP)
 - Refund Value Per Segregated Pound (RVSP)
 - Refund Value Per Commingled Pound (RVCP)
 - Provide Data / Analysis / Information
 - Legislation / Regulation
 - CalRecycle Stakeholders
 - Industry Stakeholders



Calendar for 2018 CMRS Survey

- Organize / Plan March - Sept. 2016
- Public Workshops Apr. 28 & Oct., 2016
- First Round Surveys Oct. 2016 – Mar. 2017
- Second Round Surveys Apr. 2017 – Sep. 2017
- Public Hearing for 2018 Rates Late October 2017
- Notice of 2018 Rates December 1, 2017
- 2018 Rates Effective January 1, 2018



Workshop Purpose - Recap

California Beverage Container Recycling & Litter Reduction Act Section: 14549.5

- Size of the statewide sample
 - Is approximately 125,000 containers a year enough?



Workshop Purpose - Recap

California Beverage Container Recycling & Litter Reduction Act Section: 14549.5

- Appropriate sampling methodologies
 - Are current survey and sampling methods adequate?



Workshop Purpose - Recap

California Beverage Container Recycling & Litter Reduction Act Section: 14549.5

- Alternatives to exclusive reliance on a statewide commingled rate
 - Are there better ways to determine how to pay monies from the Fund to consumers and industry stakeholders?



Survey Methodology

Questions, Comments, Input, etc.



Bale Study

In response to industry stakeholder input and concerns, CalRecycle conducted a special study to research material from curbsides (CS), drop-off / collection (CP), and community service programs (SP).



Bale Study - Objectives

- Compare current recycling program aluminum, PET, and HDPE commingled rates for CS, CP, and SP programs, with the rates derived from the Bale Rate Study.
- Provide recommendations to improve field survey and research procedures and methods.



Bale Study - Objectives

- Provide recommendations to produce more accurate recycling program rates that will appropriately compensate industry stakeholders and help protect the financial integrity and solvency of the Fund.
- Provide recommendations to provide better accounting of contamination and other materials found in CS, CP, and SP program bales that are not accounted for using current survey methods.



Bale Study Methodology

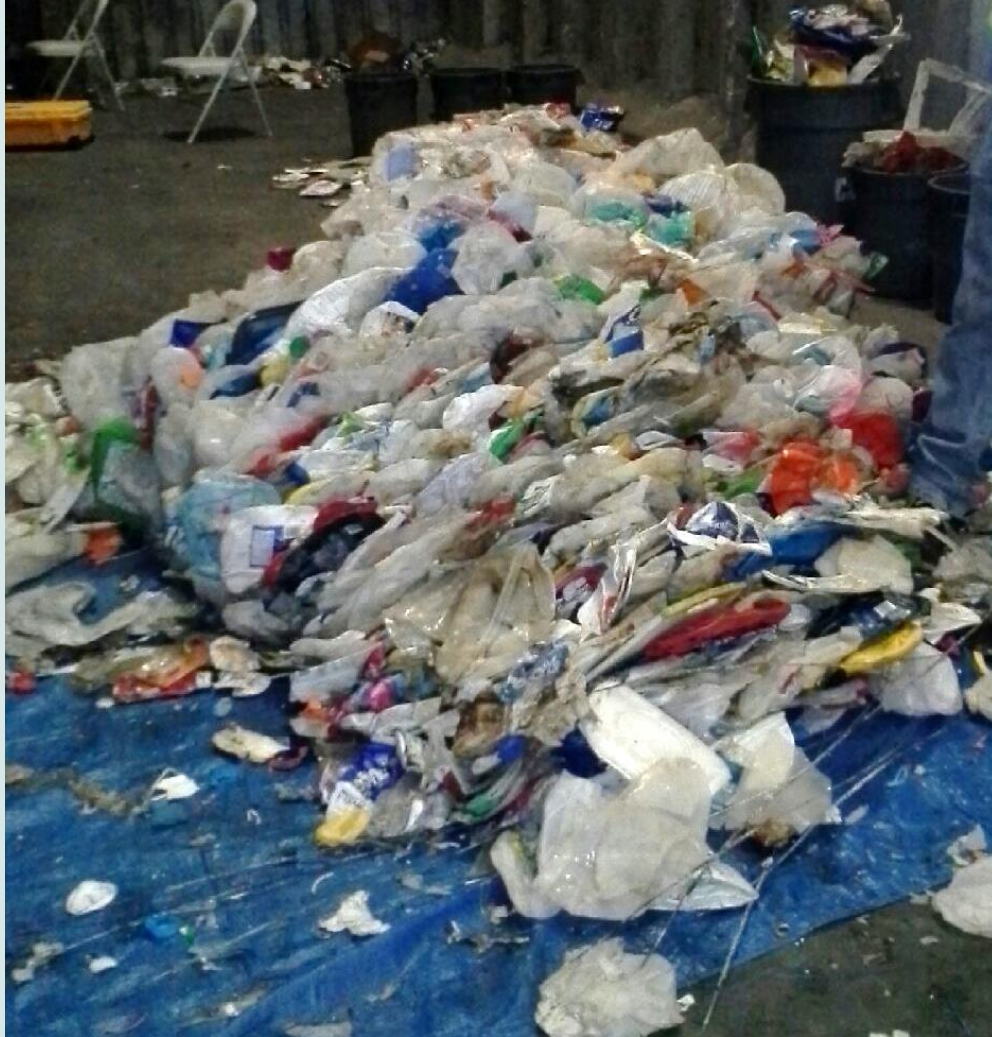
- Exploratory study to identify extent of contamination in bales
- Selected 11 facilities from 2016 rate survey sample that bale material on-site - 42 bales in total
- Bale selection for PET and HDPE from random bales from CS, CP, and SP programs only
- “Bale” selection for aluminum obtained from material right before baling



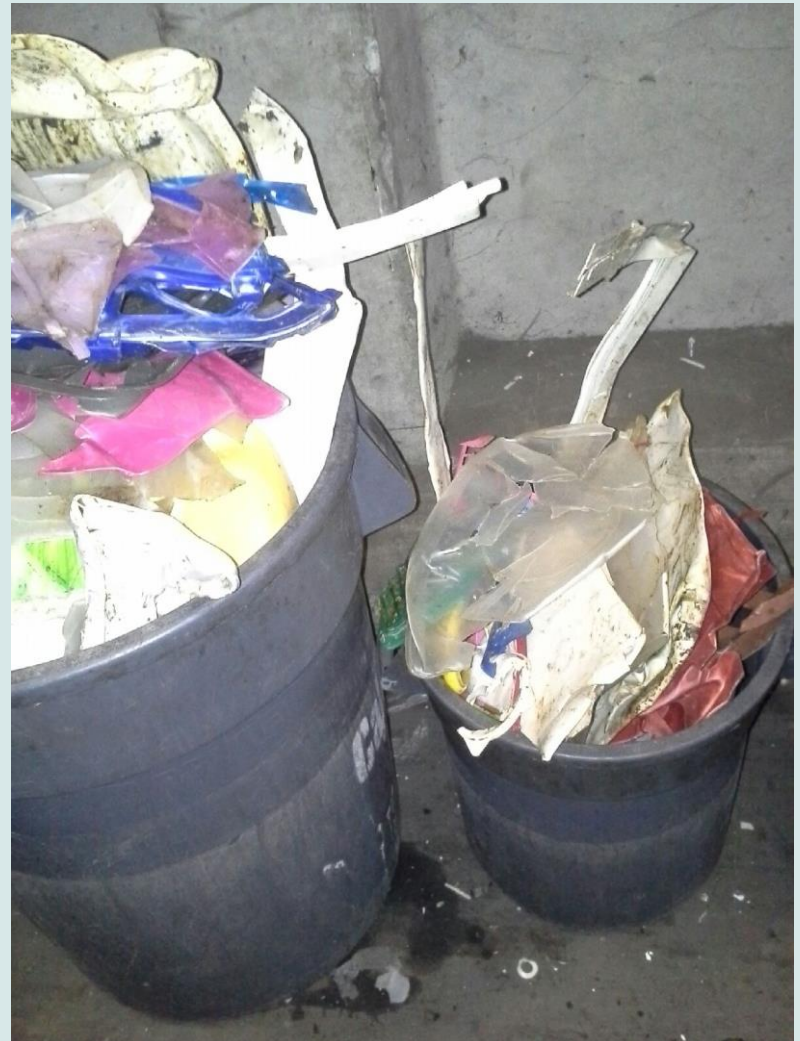
Method – Data Collection

- Bales placed on tarp and disassembled
- Material sorted by category / type e.g. PET, HDPE, dirt and debris, baling wire, etc.
- Beverage container material types sorted by CRV and non-CRV
- Recorded weight and count of material in each category

Bale Study



Bale Study



Bale Study





Bale Study - Pictures





Bale Study - Pictures





Bale Study - Pictures





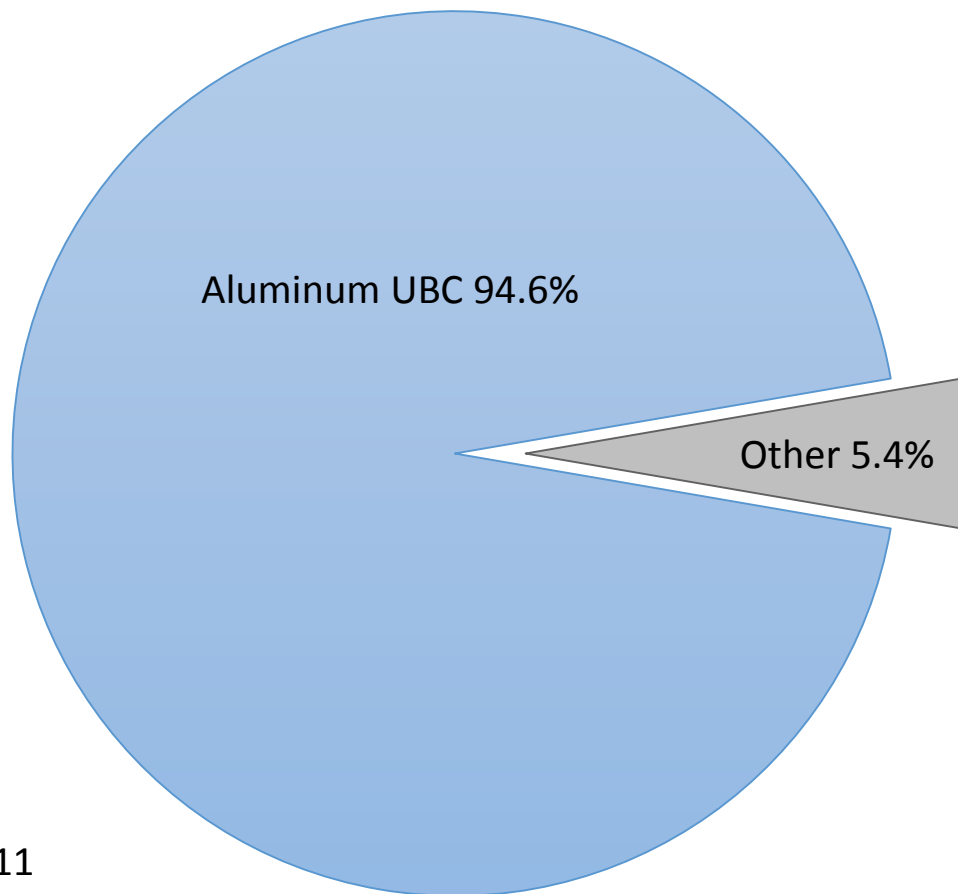
Bale Study - Pictures



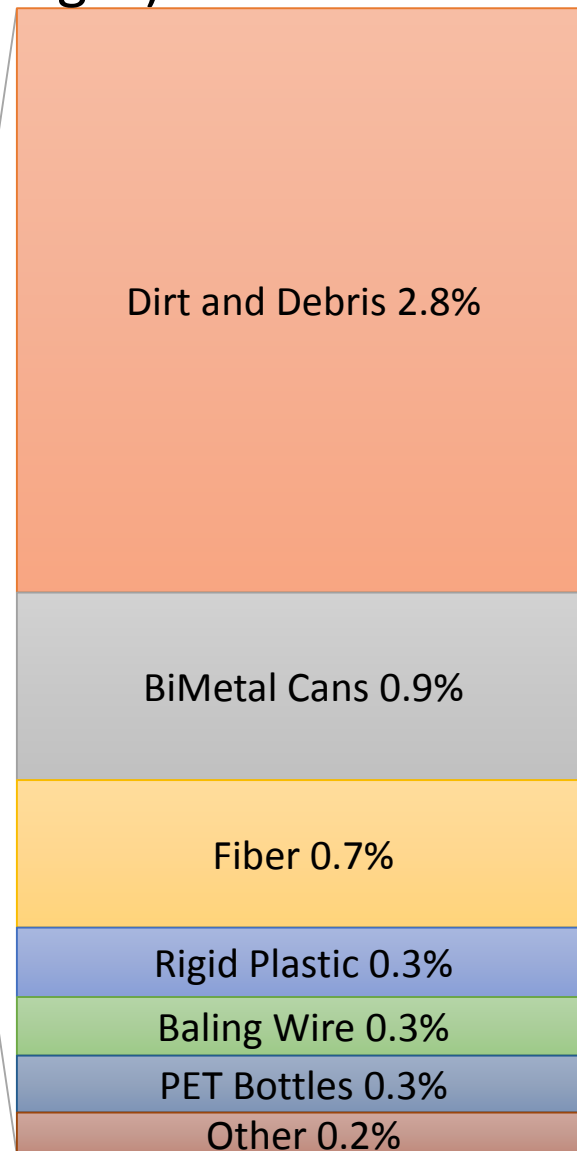


Bale Study Findings

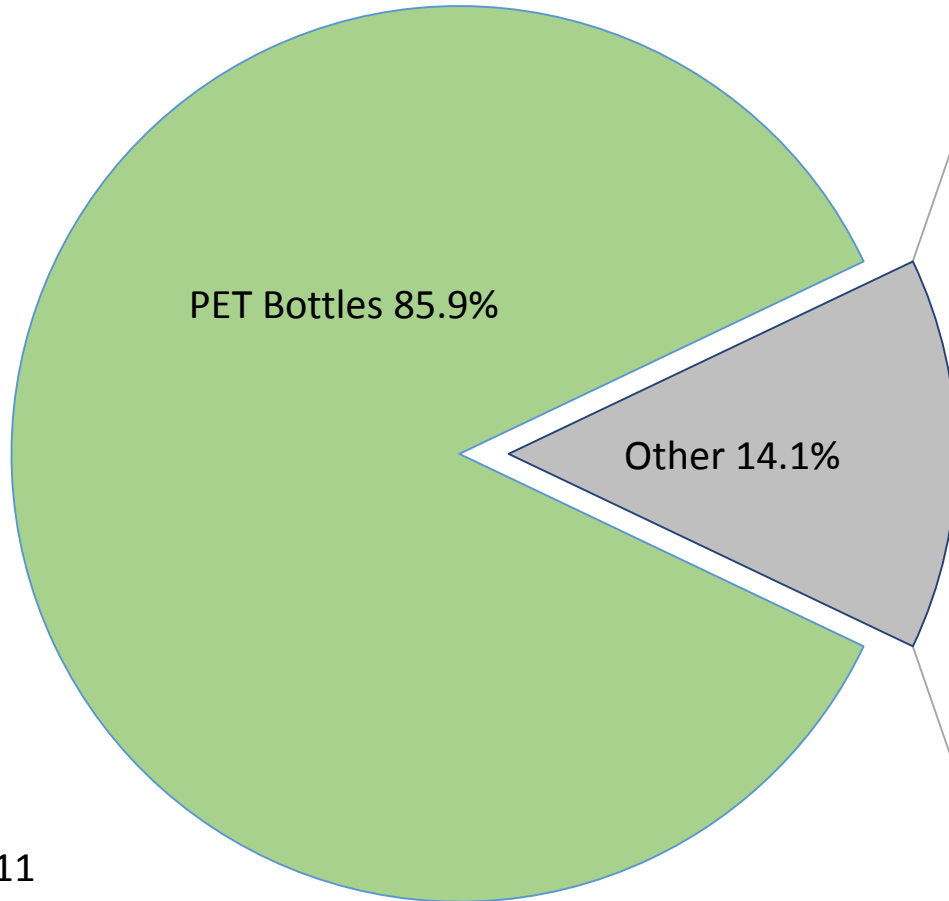
Aluminum UBC Bale Composition (% by weight)



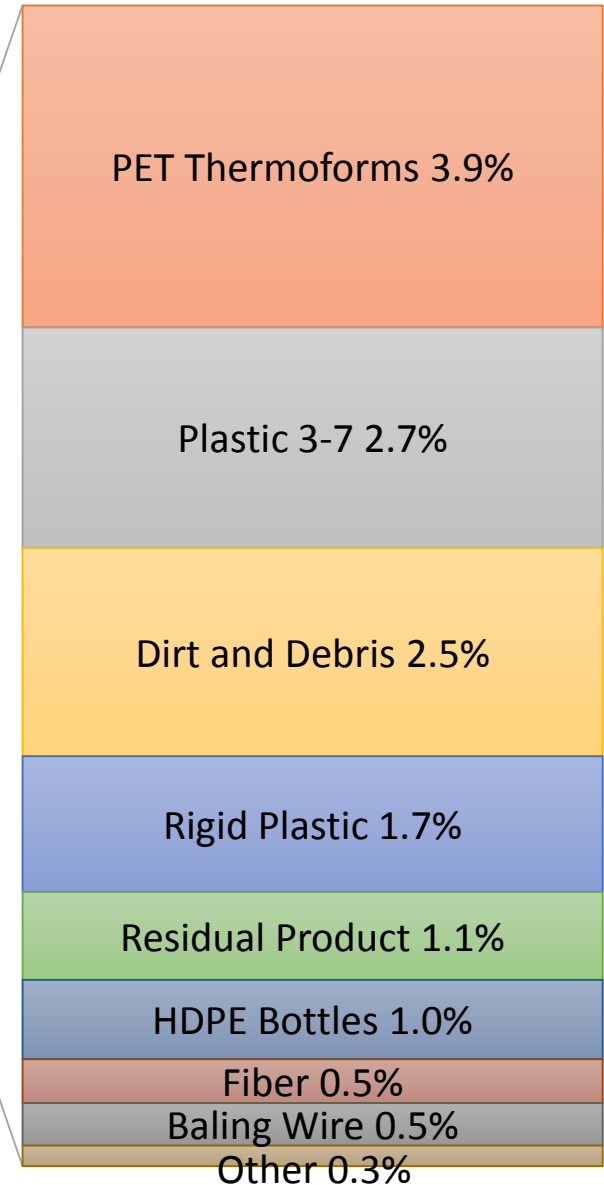
n = 11
Avg 94.6%
Min 85.6%
Max 98.8%



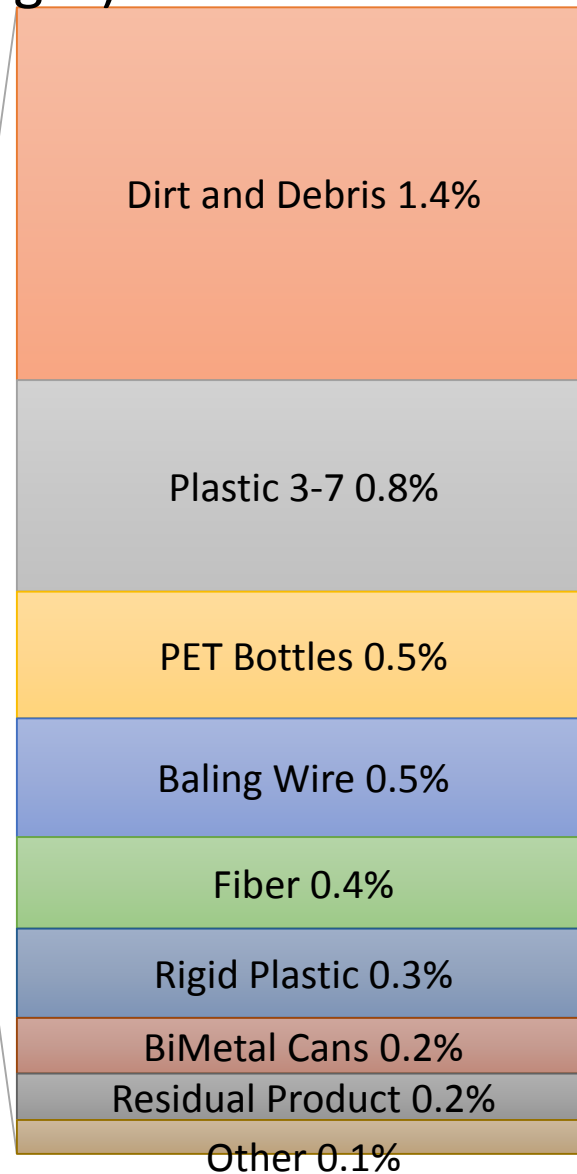
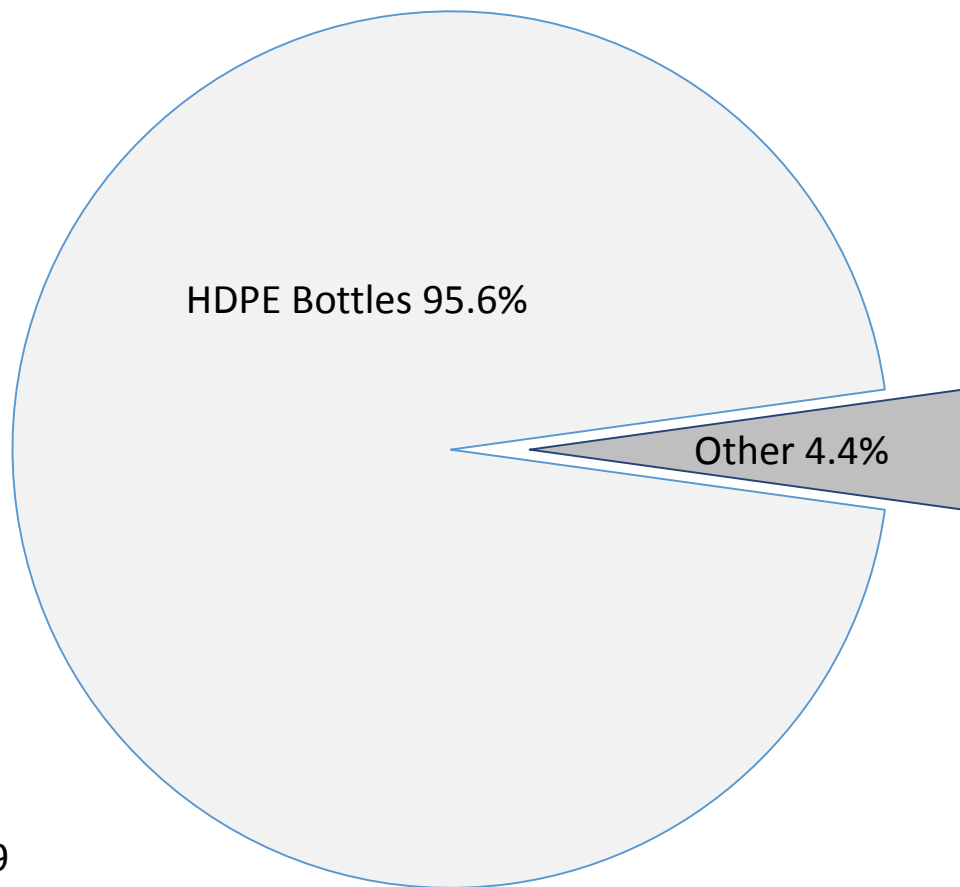
PET Bale Composition (% by weight)



n = 11
Avg 85.9%
Min 53.1%
Max 95.0%

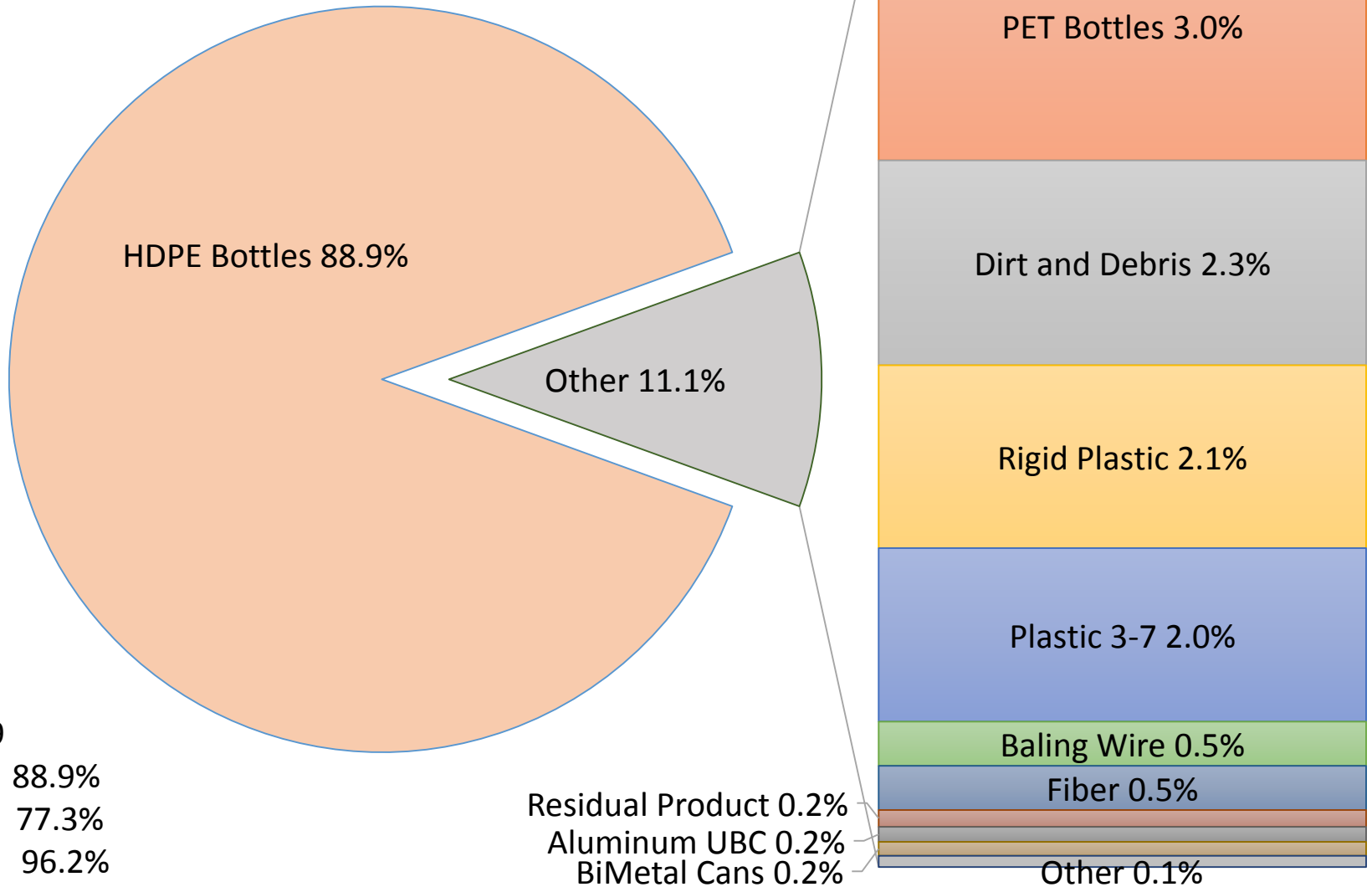


HDPE Natural Bale Composition (% by weight)



n = 9
Avg 95.6%
Min 83.6%
Max 98.5%

HDPE Colored Bale Composition (% by weight)



n = 9
Avg 88.9%
Min 77.3%
Max 96.2%



Bale Study – Next Steps

- Public & Industry Workshops
 - February 2016 to December 2016
- Goal of improving surveys methods for the **2019** Rate Year



We want to hear from you!



**Questions? / Comments? / Input? /
Ideas? / Ideas? / Ideas?**

**Is there other information or data you would
like us to share, find, research, etc. for future
presentations or publications?**



Thank You!



If you would like further information about our survey methods or rate calculations, or have input related to the recent Bale Study, please contact:

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